

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS

APPLICANTS: Nakamura et al. DOCKET NO.: P97,0322
SERIAL NO: 08/809,463 GROUP ART UNIT: 2814
FILED: July 18, 1997 EXAMINER: P. Cao
INVENTION: "MULTI-LAYERED STRUCTURE FOR FABRICATING AN OHMIC
ELECTRODE AND OHMIC ELECTRODE"

Assistant Commissioner of Patents
Washington, D.C. 20231

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APPELLANTS' REPLY BRIEF TRANSMITTAL LETTER

S I R:

Appellants submit herewith, in triplicate, Appellants' Reply under 37 C.F.R. § 1.193(b) to the Examiner's Answer in response to the Examiner's Answer mailed on November 23, 1999. Please charge any fees that may be due and owing and credit any overpayment to Deposit Account 08-2290. A duplicate copy of this sheet is enclosed for this purpose.

Respectfully submitted,

(Reg. No. 35,902)

Michael R. Hull
HILL & SIMPSON
A Professional Corporation
85th Floor Sears Tower
Chicago, Illinois 60606
Telephone: (312) 876-0200
Attorneys for Appellants

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: The Asst. Commissioner for Patents, Washington, D.C. 20231 on January 24, 2000.

Attorney for Appellants

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APPELLANTS' REPLY UNDER 37 C.F.R. § 1.193(b)
TO EXAMINER'S ANSWER

S I R:

I. INTRODUCTION

Pursuant to 37 C.F.R. § 1.193(b), Appellants submit this reply in response to the new points raised in the Examiner's Answer. Appellants respectfully submit that the Examiner's assertions are incorrect as a matter of law and fact. Thus, for the reasons set forth below, Appellants respectfully request that this Board reverse the rejection of Claims 1-19 under 35 U.S.C. § 103.

II. THERE IS NO SUGGESTION OR MOTIVATION TO COMBINE JACKSON AND NIRSCHL OR JACKSON, NIRSCHL AND ISHIHARA AS COMBINED BY THE PATENT OFFICE IN ITS OBVIOUSNESS REJECTIONS

In response to Appellants' arguments that there is no motivation to combine Jackson and Nirschl or Jackson, Nirschl and Ishihara, the Examiner cites In re Fine, 5 U.S.P.Q. 2d 1596 (Fed.Cir. 1988) and In re Jones, 21 U.S.P.Q. 2d 1941 (Fed.Cir. 1992). However, both of these cases stand for the proposition that, when the Patent Office is making an obviousness rejection based upon more than one reference, there must be some teaching, suggestion or motivation to make that combination either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 5 U.S.P.Q. 2d at 1599; In re Jones, 21 U.S.P.Q. 2d 1943-44. However, in this case, there is no such teaching, suggestion or motivation to combine the cited references.

Specifically, Claim 1 requires three elements (1) a III-V compound semiconductor body, (2) a non-single crystal semiconductor layer comprising indium, and (3) a film which includes at least a metal nitride film.

Appellants concede that Jackson discloses the III-V compound semiconductor body upon which a non-single crystal semiconductor layer is formed. Appellants also concede that Jackson discloses a metal layer disposed upon the non-single crystal semiconductor layer. However, Jackson clearly states that "the metal [layer] is not critical and any metal will make good contact." Jackson at column 6, lines 7-9.

Thus, one skilled in the art viewing Jackson would use any metal layer on top of the non-single crystal semiconductor layer. Because Jackson teaches that the metal layer is not of any consequence, Appellants respectfully submit that one skilled in the art would not seek to improve upon the tungsten silicide disclosed as the best mode in Jackson or the alternatives of aluminum or gold set forth in Examples 1 and 2 of Jackson. There is clearly no motivation in Jackson to investigate the possibility of a metal nitride layer because Jackson teaches no need for any improvement upon a simple metal layer.

Thus, Jackson provides no motivation for the combination made by the Patent Office. Regarding Nirschl, Appellants respectfully submit that Nirschl only relates to improving the metal contact in a higher band gap compound semiconductor material, namely one that has a GaP semiconductor substrate. While Appellants concede that Nirschl teaches a metal nitride layer, the metal nitride layer 5 and underlying metal layer 2, are deposited on a III-V semiconductor substrate - not a crystal layer and certainly not a non-single crystal semiconductor layer.

Therefore, not only does Jackson not provide any motivation to search for an improvement to tungsten silicide, gold or aluminum which he discloses, one skilled in the art viewing Jackson would not even look to

Nirschl for guidance in attempting to provide such an improved metal layer on a non-single crystal semiconductor layer because Nirschl teaches a metal layer on a III-V semiconductor material, not a non-single crystal semiconductor layer.

Still further, the combination of Jackson and Nirschl makes no sense because Nirschl only relates to improving the metal contact in higher band gap compound semiconductor material, such as a GaP semiconductor substrate. In contrast, the Jackson reference focuses on improving the metal contact in devices that incorporate a lower band gap semiconductor material such as indium between a metal layer and a higher band gap semiconductor. See Jackson at columns 1-2.

Accordingly, the obviousness rejection of all claims fail because there is no suggestion or motivation to combine Jackson and Nirschl. In re Rouffet, 47 U.S.P.Q. 2d 1453, 1456 (Fed.Cir. 1998). There is no suggestion to combine Jackson and Nirschl in the explicit or implicit teachings within Jackson and Nirschl themselves and the Patent Office has provided no evidence that such a suggestion to combine is found in either the ordinary knowledge of those skilled in the art or the nature of the problem to be solved. Id. at 1458.

With respect to the rejection of dependent Claims 5, 6, 8, 15, 16 and 18 as being unpatentable over Jackson and Nirschl in view of Ishihara, the Patent Office cites In re Linter, 173 U.S.P.Q. 560 (CCapA 1972) in support of the combination of Jackson, Nirschl and Ishihara taking the position that "it is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by Appellants". Appellants respectfully submit that In re Linter is a chemical case. In In re Linter, the claim at issue is directed toward a laundry composition that included a detergent, detergent builders and a cationic softener. The claimed composition included sugar. The primary prior art reference included all of the ingredients of the claimed

composition except sugar. Two secondary references were cited because they disclose the use of sugar in conjunction with a cationic softener as a filler or a weighing agent. Linter attempted to argue that the use of sugar by the secondary references provided a different result than Linter's use of sugar. However, the primary reference, Germann, achieved all of the result of the claimed composition without the addition of sugar. Id. at 563. In any event, the Linter claim is directed toward a composition, not a structure like Appellants' claims.

Ishihara is cited for the proposition that it discloses the use of a refractory metal film. However, Ishihara does not teach or suggest the use of a refractory metal film on a non-single crystal semiconductor layer. Ishihara, instead, only discloses the use of titanium as an adhesion layer in a multi-layer contact structure. Thus, Jackson does not suggest any departure from the tungsten silicide, aluminum or gold layer on his crystal semiconductor layer and neither Nirschl nor Ishihara suggest the use of any alternative layer on a non-single crystal semiconductor layer. Therefore, there is no motivation to combine Jackson with either of these two secondary references and the Patent Office's obviousness rejections simply fail. The In re Linter case is inapposite because it relates to a composition, not a structure.

III. THE CITED REFERENCES DO NOT ADDRESS THE PROBLEM, MUCH LESS SOLVE, THE PROBLEM CONFRONTED BY APPELLANTS

The problem addressed by Appellants' invention is the improvement of thermal and contact resistance properties of an ohmic electrode suitable for III-V compound semiconductors. The cited references fail to address or discuss the problem confronted by Appellants. Appellants respectfully submit that the Patent Office is required to consider the cited references' failure to address or discuss the problem confronted by Appellants. Indeed, the "discovery of a problem is often an essential element in an invention correcting such a problem." In re Shaffer, 108

U.S.P.Q. 326, 329 (CCPA 1956). The fact that the art fails to consider the problem faced by Appellants is indicative of nonobviousness. Diversitech Co. v. Century Steps, Inc., 7 U.S.P.Q. 2d 1315, 1318 (Fed.Cir. 1988).

In failing to address the problem faced by Appellants, the Patent Office has not viewed the primary or secondary references in their entirety but, instead, has simply resorted to taking statements out of these references out of context in order to formulate the obviousness rejections. The Patent Office must view all references as a whole and consider the portions arguing against the claimed invention. Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 U.S.P.Q. 416, 420 (Fed.Cir. 1986). When the references of record are duly considered in their entirety, Appellants respectfully submit that they fail to teach or suggest the claimed invention.

IV. CONCLUSION

For the foregoing reasons, Appellants respectfully submit that the Examiner's Answer does not overcome Appellants' Appeal Brief. Therefore, Appellants respectfully request that this Board reverse the rejections proposed by the Patent Office.

Respectfully submitted,

(Req. No. 35,902)

Michael R. Hull
Hull & Simpson
A Professional Corporation
85th Floor, Sears Tower
Chicago, Illinois 60606
(312) 876-0200 - Ext. 3491
ATTORNEY FOR APPLICANTS

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I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Assistant Commissioner of Patents, Washington, D.C. 20231 on January 24, 2000.

Attorney for Applicants